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Data Guided Treatment of Retarded

Probers Charge Top Psychologist Faked Research Results

A confidential draft report of a government-commissioned investigation concludes that a widely published and influential psychologist, Stephen E. Breuning, fabricated massive amounts of data concerning the effects of behavior-control drugs on severely retarded, institutionalized persons.

SGR has obtained a copy of the draft, which is the product of a dawdling inquiry that originated in complaints that research colleagues of Breuning made to the National Institute of Mental Health (NIMH) in December 1983.

The report also charges that the University of Pittsburgh and the University of Illinois failed "in their obligation to ensure responsible science and to pursue diligently any allegation of scientific misconduct brought to their attention." While at Pittsburgh, from 1981 to 1984, Bruening held an NIMH grant for $133,000 as principal investigator on a study titled "Stimulant Drug Use with Mentally Retarded Children." In addition, he was a consultant on an NIMH-supported research project at Illinois.

The allegations and conclusions, strongly denied by Breuning in a telephone conversation with SGR, are the ugliest in the steady trickle of scientific-misconduct cases that have come to public attention in recent years. The previous cases mainly involved mere data on paper and were generally caught before they could have any effects outside the laboratory. But the Breuning case is different: As the investigating panel stresses in its report, his research publications have strongly influenced treatment practices for severely retarded patients with serious behavorial problems.

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For controlling their behavior, Breuning, drawing on his claimed research findings, has supported a reduction in use of neuroleptic drugs, such as thorazine, in favor of stimulants, such as dextroamphetamine. He claims the latter are more effective and produce fewer undesirable side effects, including tardive dyskinesia, a neurological disorder with symptoms similar to those of Parkinson's disease.

The draft report on Breuning was prepared by a five-member panel of academics (see P.3) convened in January 1985 by NIMH. It describes him as "having achieved the status of a major worker in the field of mental retardation," and states that Breuning's published works have had "a significant impact" on "social policies concerning the care and treatment of the mentally retarded." It notes that "There can be no question that States (e.g., Connecticut) have amended policies gov-

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In Brief

The Administration's fear of foreign exploitation of American R&D has been invoked against its own proposal to contract operation of the National Technical Information Service to a private company. An analysis drawn up by the Science Policy Research Division of the Congressional Research Service warns that "there is a possibility that the contractor with the best offer could be: a foreign company or a US company later purchased by a foreign firm . . . . It is uncertain if either the executive branch or Congress would find this acceptable, particularly in light of the heightened concern over US competitiveness and technology transfer."

Rah-rah research: With science linked to the competitiveness stampede, political figures are gushing with praise for the wonders of R&D. In remarks to a conference on Science and Technology in the Sunbelt, March 3 on Capitol Hill, Senator Strom Thurmond (R-SC), emphatically declared: "If you don't have research, you fall behind." The Senator added: "More research means more jobs."

The Congressional Biomedical Ethics Board, signed into law in November 1985, continues its slow pace toward actually going into business as Capitol Hill's own think tank on biomedical issues. The required 12-member Congressional Board has been organized for this session of Congress, with Rep. Willis Gradison (R-Ohio) as Chairman. But nothing substantive can happen until the Board appoints the required 14-member advisory committee. The committee will appoint the fulltime professional staff that will do the work. A list of advisory candidates is currently under review at the Office of Technology Assessment. Meanwhile, the Board has no offices, or even a telephone number.

. . . "A Deliberate and Intentional Effort to Mislead"

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erning treatment practices in an effort to be consistent with what Dr. Breuning reports as scientific findings in his public addresses."

The panel concluded that many reported studies that underpinned Breuning's professional reputation were never conducted, that Breuning's preparation of "two grossly distorted, but polished and detailed, progress reports could only have been a deliberate and intentional effort to mislead and deceive" NIMH, and that he "repeatedly engaged in misleading and deceptive practices in reporting results of research . . ." The panel added that "it did not find credible Dr. Breuning's shifting explanations as to where the various studies were carried out," and it unanimously concluded that Breuning "has engaged in serious scientific misconduct."

Breuning Challenges Report

The 32-page draft report by the investigating panel was completed last December and was sent early in January to Bruening and others for comment. Breuning told SGR in a telephone conversation on March 9 that he has prepared a 30-page response reflecting "lots of concerns and criticisms." He said the panel failed "to interview many of the right people" and that "I was never asked to give names of people to interview." Bruening said that the panel "tried to do a thorough job, but they're not trained detectives." He added that, "it would have been logical for them to talk to me first, but they talked to me last." Bruening advised SGR editor Greenberg to "talk to my lawyer." SGR promptly telephoned Breuning's lawyer, Tom Coval, in Philadelphia. Coval said, "No comment," and refused to discuss any aspect of the case.

Breuning, a Ph.D, now age 34, claims to have conducted his research at various institutions, starting with his first place of professional employment, the Oakdale Regional Center for Developmental Disabilities, Lapeer, Michigan. He was employed there in 1977 directly after receiving his Ph.D. from the Illinois Institute of Technology, where he wrote a dissertation on "Classical Conditioning in Goldfish." According to his curriculum vitae, the panel reports, for six months while at Oakdale he also held the post of Director of Behavioral Programs and Research in a project of the South Suburban Chicago Schools. In 1978, he moved to the Coldwater (Michigan) Regional Center for Developmental Disabilities, where he served as a staff psychologist until 1981. Following that, he was an Assistant Professor of Child Psychology at the University of Pittsburgh until 1984, and also was Director of the John Merck Program at Pittsburgh's Western Psychiatric Institute and Clinic.

While at Pittsburgh, Breuning was associated with a research project at the University of Illinois, Urbana-Champaign, for which the principal investigator was Robert L. Sprague, Director of Illinois' Institute for Child Behavior and Development. Sprague says that Breuning's data on drug effects on retarded children aroused his suspicions. "They were just too good to be true," Sprague says. Sprague's suspicions, voiced with another researcher on mental retardation, C. Thomas Gualtieri, Associate Professor of Psychiatry at the University of North Carolina, were expressed to NIMH, and the University of Pittsburgh and the University of Illinois in December 1983. Inquiries were conducted by both schools.

The NIMH investigating panel looked into those investigations and concluded that they were inadequate. The panel's draft report states that Illinois concluded "that there appeared to be a reasonable basis for suspecting fraudulent scientific practice by Dr. Breuning," but that the research of his Illinois-based collaborator, Sprague, was independent of Breuning's and that Sprague "had taken appropriate action in notifying responsible officials of his concern." Illinois concluded, in the words of the NIMH draft report, that "there was reasonable cause for a thorough investigation and assumed that it would be carried out by the University of Pittsburgh."

Meanwhile, according to the NIMH panel, an inquiry that Sprague had touched off at Pittsburgh looked into research studies that Breuning claimed to have performed before coming to the university and concluded that they "were unable to be supported by data." NIMH urged Pittsburgh to look into Breuning's performance with the NIMH grant he held at the university. But, in the meantime, Breuning resigned from Pittsburgh, and the investigating committee sought to drop the matter.

NIMH, however, urged further inquiry, and Pitts-

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Panel Members Drawn from Leading Research Centers

The panel appointed by NIMH in January 1985 to investigate scientific misconduct charges against Stephen E. Breuning is composed of five senior professionals with—in the words of the panel's draft report—"extensive experience in mental retardation, pharmacologic treatment, behavior analysis, and research design and methodology."

The Chairman is Arnold J. Friedhoff, MD, Professor of Psychiatry and Director of the Millhauser Laboratories, NYU School of Medicine. The other members:

C. Keith Connors, PhD, Director of Research, Department of Psychiatry, Children's Hospital National Medical Center, Washington, DC

Richard I. Shader, MD, Chairman of Psychiatry, Tufts School of Medicine, and Psychiatrist-in-Chief, New England Medical Center

Herbert G. Vaughan Jr., MD, Director, Rose F. Kennedy Center for Research in Mental Retardation and Human Development, and Professor of Neuroscience, Neurology and Pediatrics, Einstein College of Medicine

Edward F. Zigler, MD, Professor of Psychology, Yale University

The investigating panel was provided with staff support from within NIMH and the General Counsel's Office of the Department of Health and Human Services.

According to Wright Williamson, NIMH Policy Officer for Ethics in Science, comments from the parties discussed in the draft report are due by the end of March. The investigating panel will then meet again to consider the comments in preparation of a final report. The report will be submitted to the head of NIMH, currently Acting Director Frank J. Sullivan. It then goes up the line for review by NIMH's parent agency, the Alcohol, Drug Abuse, and Mental Health Administration.

The range of possible actions, Williamson said, runs from exoneration to an assortment of sanctions against the accused. Sanctions, he said, include a requirement that future NIMH support be performed under supervision, temporary ineligibility for NIMH support, and permanent "debarment."

Williamson said that misconduct cases are a rarity at NIMH, and suggested that a lack of familiarity with investigating such matters accounts for the prolonged proceedings—now past the three-year mark.

That may be the case in this instance, but the fact is that both the federal research establishment and its collaborators in academe have little stomach for prying into the messy business of scientific fraud. As reported in SGR last year (Vol. XVI, Nos. 17-19), the National Institutes of Health has been investigating a case of alleged scientific misconduct at Cornell University Medical College since July 1982—and has still not rendered a verdict, or even produced a final investigative report on what happened.

NIMH

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burgh's Department of Psychiatry formed an ad hoc committee to conduct an investigation of Breuning's research at Pitt under his NIMH grant. The draft report of the NIMH investigating panel states that the ad hoc committee found that "data for the majority of subjects reported in Dr. Breuning's progress reports under [the NIMH grant] could not be identified as studies conducted on the Merck unit [where Breuning was Director of Research]."

While the two universities engaged in the faintheartened inquiries—for which the NIMH panel has now chastised them—Sprague repeatedly attempted to prod NIMH into taking his doubts seriously. But even now—over three years later—the case officially remains under investigation, and unresolved.

The NIMH draft report "commends" Sprague "for bringing to the attention of NIMH his concerns about Dr. Breuning's work and his continued cooperation with NIMH and the panel in investigating those concerns." But having praised Sprague for sounding the alarm, it inexplicably adds that, though at Illinois, he should have supervised Pittsburgh-based Breuning more closely. It also "questioned Dr. Sprague's judgment in uncritically including Dr. Breuning's publications, on which he himself was not a co-author, in his grant progress report."

Breuning is currently Director of Psychological Services and Behavioral Treatment at the Polk Center, Polk, Pennsylvania. He is the co-author, with Alan Poling, of what is regarded as a standard text, *Drugs and the Mentally Retarded,* published in 1982. Breuning is also the author or co-author of many articles in the leading professional journals on mental retardation, including *The American Journal of Mental Deficiency, Applied Research in Mental Retardation, The Journal of Nervous and Mental Disease, The Archives of General Psychiatry,* and *Pharmacology, Biochemistry & Behavior.*

As detailed in the draft report by the NIMH-appointed panel, which met eight times between March 1985 and December 1986, virtually no corroboration could be found for Breuning's claims of having conducted the research that he reported in various publications. In his first job, at Oakdale, he received permission to continue

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. . . Reported on Research Conducted a Decade Earlier

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his goldfish studies, the panel reported. Regarding his claims of having conducted clinical research on patients at Oakdale, the panel stated:

"Records at Oakdale show that no requests from Dr. Breuning for research with human subjects were approved. Those of his colleagues and supervisors who were contacted were unanimous in their view that he had not, and could not have, conducted research with human subjects as reported in the studies attributed by him to Oakdale."

The investigating panel also reported discrepancies in "progress reports" that Breuning submitted from Pittsburgh as principal investigator for his NIMH-supported project on "Stimulant Drug Use with Mentally Retarded Children." Though the grant was awarded for research to be conducted at Pittsburgh, the report states that "Breuning told the panel that the work described in his progress reports . . . was actually carried out in Chicago area schools almost 10 years before . . . . He maintained that he attached himself to studies in progress. He could recall neither the names of the investigator(s) nor the name or location of any school or institution where he had gathered data . . . . A data book he provided to the panel had no identifying material of any kind, including dates."

Colleagues Dispute Claims

Breuning, the panel continued, identified two persons who he said "could verify his having done such work in the Chicago area." One of them, the panel reported, "said he knew of no such work done by Dr. Breuning." The other, the panel, noted, "said . . . that he knew nothing of any research by Dr. Breuning involving human subjects and that he had not been involved in arranging for Dr. Breuning to conduct such research."

The panel reported finding some evidence of research conducted by Breuning, but none of it very substantial. Thus, it states that some of Breuning's Coldwater, Michigan, colleagues during his 1978-81 service there said that "he had been a catalyst for research activities." The panel reported, too, that "Dr. Breuning had access to and made use of school records . . . . and some residents [of the institution] were sent to him for testing." But in assessing the validity of two papers that Breuning said were derived from research he performed at Coldwater, the panel reported that it found "no evidence that such research had been carried out there. Nor did the panel find credible Dr. Breuning's assertion that such data were collected at unnamed schools through studies by unnamed investigators in the Chicago area. The panel concluded that the two studies were not carried out."

The report is filled with similarly damning conclusions about Breuning's other publications, including a chapter that he co-authored in the 1982 book *Drugs and the Mentally Retarded.* The chapter was reportedly based on the collection and computerized analysis of questionnaires concerning 3496 retarded persons in foster group homes in four states. "On questioning," the panel reported, "Dr. Breuning was able to provide the name of only one person who was said to have participated in the project, and that person told panel staff that he had no knowledge of the study . . . . The computer center Dr. Breuning said he used for the analysis of this data had no record of his using their equipment."

Publication "Seriously Misleading"

Neither of Breuning's collaborators on this reported survey, the panel continued, "ever saw any primary data, nor did they have any idea how such a large study had been paid for. Both stated independently that they were involved in preparing only the introductory portions of the work and that Dr. Breuning had arranged for data collection and analysis and had done most of the writing.

"These considerations," the report states, "brought the panel to the conclusion that the study described in this chapter was not carried out." A similar conclusion was stated about review chapters co-authored by Breuning in a 1984 book, *Assessing the Mentally Retarded* (which he also co-edited). "All of these review publications relied heavily on Dr. Bruening's own work, which the panel concluded was not carried out as reported. The publications, therefore, must be regarded as scientifically unsound and seriously misleading."

Regarding grant applications and research reports produced by Breuning while at Pittsburgh, the panel reported that "Some colleagues, listed as co-investigators on the application(s), or co-authors on manuscripts, were not aware until later that their names had been so used. When Dr. Breuning met with the panel," the report continued, "he acknowledged that none of the subjects described in the progress reports was studied at Pittsburgh."

Under challenge, the panel reported, Breuning said the data were collected a decade before in Chicago by—in the panel's words—"unknown investigators, in unknown places, and with unidentifiable subjects." Terming this claim "not credible," the panel stated, "Dr. Breuning was aware that funds awarded to him were not for the purpose of reporting data collected 10 years earlier."

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Project SOCRATES: New DoD System Tracks Technology

Under the title "Project SOCRATES," the Defense Intelligence Agency (DIA) is setting up a program, largely classified and apparently big, to keep track worldwide of technological developments that may have national security implications for the United States.

The existence of the program has not been hushed up, but neither has it been openly discussed outside of limited circles. According to a February 11 memo from the DIA, which serves as the intelligence arm of the Pentagon, "SOCRATES includes a top-down revamping of the intelligence process which enhances and focuses the collection, dissemination, analysis, and production aspects required for" making assessments of foreign technological capabilities. SOCRATES is elsewhere described as "a very comprehensive information support system [which] seeks out and combines many sources of specific and credible technology data worldwide. These data are used by intelligence analysts who are charged with assessing the foreign marketplace."

DIA started SOCRATES in 1984, but the "full system," according to one official, is just now a "few months" away from becoming operational. A DIA publication on SOCRATES lists its functions as "Providing Foreign Technology Assessments for: Policy Makers, Export licensing, Export control and enforcement, International export deliberations, Military weapons designers, US Intelligence Community."

SOCRATES is apparently obtaining at least some of its expertise by piggybacking on scientists and engineers working in Department of Defense and Department of Energy military laboratories and for defense contractors. The SOCRATES distribution list does not include any laboratories of federal civilian agencies.

With an assurance of "very little impact on a laboratory researcher's time," a recent DIA memorandum to military and DOE laboratories outlines a new program within Project SOCRATES—the Laboratory Researcher-to-Intelligence-Analyst Cooperative (LABIC). The participants are listed as the DOE, Air Force Systems Command, the Army Materiel Command, plus membership or an "expressed interest" of the Naval Oceans Systems Center, Naval Weapons Laboratory, Naval Air Development Center, and the Naval Surface Weapons Center.

According to the memorandum, "LABIC is a two-way street, or true cooperative. Neither [DIA] analysts nor researchers are tasked to prepare any studies or reports, but are merely asked on an occasional, as-needed basis, for information which is currently in their possession. This helps provide the analysts with some of the data they need to make SOCRATES technology assessments by their being made aware of other foreign producers and products with which the researcher is familiar."

LABIC is in the unclassified portion of SOCRATES, along with three other unclassified programs. For what it's worth, these have been identified to SGR only as the Emerging Technologies Tracking System, the Laboratory Technology Outlining Effort, and Human Science and Technology Collection Augmentation. At least six other programs are classified and not even their titles are available.

NIMH

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Under the heading "Conclusions regarding Dr. Breuning," the draft report of the panel states: "It is the unanimous conclusion of the panel that Stephen E. Breuning knowingly, willfully, and repeatedly engaged in misleading and deceptive practices in reporting results of research supported [under two NIMH grants]; that he did not carry out the described research, and that only a few of the experimental subjects described in publications and progress reports were ever studied; and that the complex designs and rigorous methodologies reported were not employed. Dr. Breuning also misrepresented, implicitly or explicitly, the locations at which the research was supposedly conducted. The panel did not find credible Dr. Breuning's shifting explanations as to where the various studies were carried out and his ultimate contention that many were conducted years before in the Chicago area.

"The panel unanimously concludes, on the basis of all the facts, that Dr. Stephen E. Breuning has engaged in serious scientific misconduct."—DSG

House Plans Technology Study

A major study focused on technology is being planned by the House Science, Space, and Technology Committee as a follow-on to the work carried out in 1985-86 by its specially appointed Task Force on Science Policy.

Details of the technology study have not yet been worked out, but it's been decided that it will be chaired by Rep. Buddy MacKay (D-Fla.), with Rep. Ron Packard (R-Calif.) as the ranking minority member. Trained as a lawyer, MacKay, now in his third term, is from Ocala. Unlike many of his colleagues on the committee, he's a fairly regular attendee at hearings and asks intelligent questions. Packard, from Carlsbad, in San Diego County, is also a third termer. He's trained as a dentist—a rare profession in Congressional ranks.

The 1985-86 science-policy study dealt mainly with federal support of academic basic research.

Keyworth Update: Ex-Reagan Aide a Thriving Consultant

Where's George A. Keyworth II, the little-known Los Alamos physicist who came to Washington in 1981 and made a big splash during five years of loyal and pugnacious service as Ronald Reagan's Science Adviser?

The answer is that Keyworth has remained in Washington as founder and head of a private industrial consulting firm, The Keyworth Company, and he looks happy and prosperous. His offices—spacious and expensively furnished—are located in a new, plush building on the Georgetown waterfront, half a mile downstream from Key Bridge, looking out on the Potomac. Working for him is a staff of about 10, most of whom worked for him when he was Reagan's Science Adviser. Keyworth quips that the company "is all my own. It's my debt," he says, adding that in just 10 months, it has developed "into a good solid business."

Keyworth says that like most of his predecessors in the White House post, he drew offers of university presidencies and high-level corporate jobs when word got around that he planned to leave. "But I decided I had had enough of bureaucracy," he said, "and I decided to go out on my own."

Leaving government service in January 1986, he experienced a brief false start when he and a partner, Herbert Meyer, a former CIA official, quickly went their separate ways. The original Keyworth-Meyer plan called for showing major firms how to set up their own systems for collecting and analyzing business information. But that went by the wayside when Keyworth formed his present company, which is more along the traditional lines of consulting about long-term trends in markets, technology, and products.

He says he has six firms as clients, including Hewlett-Packard, of which he's a member of the board of directors, and Leading Edge, the American-owned international conglomerate best known for its fast-selling Korean-built IBM clones. He wouldn't name other clients.

Keyworth says that his firm's role is to "help a company use technology to develop a more competitive position. We try to help a company develop a vision." His firm does not do any lobbying, he said. A champion of the industrial competitiveness theme long before it became fashionable in Washington, Keyworth says there's no conflict between his work with Leading Edge and his past and present exhortations for American industry to make better use of R&D to improve competitiveness. The head of Leading Edge, an American, Michael Shane, is committed to restoring manufacturing in the US, Keyworth says, stressing that he's working with the company toward that goal.

The Washington science-policy crowd rings with various speculations on why Keyworth resigned from the White House. As he has said in the past, two factors accounted for his decision: Having been there for five years, "it was getting to be less fun." And his political mentor and ally, Edwin Meese, had left the White House to head the Justice Department. Speaking of Meese's successor, Keyworth says, "Don Regan's interest in technology was not exactly profound, but we got along."

Still an SDI Booster

While working for Reagan, Keyworth grated many academics with his unstinting cheerleading for the Strategic Defense Initiative and his frequent assertions that the university culture was out of harmony with the country's economic needs. He hasn't changed on either issue. He regards campus-based science and engineering research centers—espoused by Reagan in his State of the Union and growing in the federal budget—as the most important achievement of his work as Science Adviser. And based on what he says are his own Congressional soundings, he's confident that the Superconducting Super Collider will easily receive Congressional approval. Keyworth confirms that he's often in touch with his White House successor, William R. Graham, whom he describes as a good friend.

Asked about Graham's continuing avoidance of the press—after six months in office—as contrasted with his easy accessibility while in government, Keyworth shrugs it off. He praises Graham "as very thoughtful and thorough," and notes that there's a big difference between joining an Administration at the beginning and coming in for the final two years.

In addition to his consulting work, Keyworth has become part of the stable of experts that the Washington press corps turns to for pithy comments on issues in their domain. He turns up now and then in the *New York Times* and the *Washington Post*, and occasionally on TV news.

In May, Keyworth will lecture at Fudan University, in Shanghai, where he holds an appointment as an honorary professor. He obviously likes his reincarnation as businessman after twenty years of combined government service at Los Alamos and the White House. "I don't want to depend on having been Ronald Reagan's Science Adviser," he says.

Industry Slows R&D Growth

While Washington exalts research as a key element of industrial competitiveness, industry is slowing the growth of its own R&D budgets, according to a wide-ranging survey conducted by the National Science Foundation.

NSF reports that reasons offered by R&D directors for the decline included "US corporations' concerns for short-term profitability and the restructuring of R&D efforts after corporate mergers." It noted that some R&D officials were hesitant to make spending forecasts because "their companies' involvement in takeovers, mergers, and reorganizations made it unusually difficult to make final plans for next year's R&D activities."

Though the rate of growth is down, the total of industrial R&D spending will nonetheless hit a record high this year—an estimated $60 billion, which roughly matches the federal government's R&D budget. But what's evident from the NSF survey is that industry is no longer running ahead of Washington in the rate of expansion of R&D spending. In the decade up to 1985, industrial R&D spending experienced an annual average growth rate of 6 percent (in 1982 dollars), according to NSF. But for 1985-87, the annual increase is estimated at 2 percent.

In real money, industrial R&D spending went up by 7 percent in 1986, and is expected to rise by 5 percent this year.

The NSF survey received replies from 67 of 92 firms contacted about a year ago; among the respondents, says NSF, were 14 of the country's 20 biggest industrial R&D spenders.

The NSF survey report also cited accounts of internal changes in industrial R&D operations that have drawn little notice in science-policy circles. Thus, it says that three-quarters of the responding R&D directors reported that their R&D spending "was increasing at a faster rate than their gain in employment of R&D scientists and engineers. The principal reasons advanced were higher technological costs, including computer expenses, increases in their contracting out of research and development, and higher salaries of scientists and engineers."

NSF also noted that some R&D directors reported more use of "consultants for particular projects." And, "Increasingly, contracts were made with universities to conduct research that might be shared with other researchers and companies."

(The report, NSF 86-314, four pages, is available without charge from NSF, 1800 G St. NW, Washington, DC 20550; tel. 202/634-4622).

Perpich Joins Hughes Institute To Head New Program

Joseph G. Perpich, at age 45 a Washington legend of career mobility, has signed on to help dispense money from the biggest mountain on the philanthropic landscape, the $5.2-billion Howard Hughes Medical Institute.

His appointment was announced last week, shortly after the Institute and the Internal Revenue Service worked out an agreement that permits Hughes to expand into new activities and go beyond its present spending of some $200 million a year.

Perpich, who is a lawyer and a physician trained in psychiatry, comes to Hughes after three years at Meloy Laboratories, Springfield, Va., where he was Vice President for Planning and Program Development. Earlier in his Washington career, he was a law clerk at the US Court of Appeals, a Congressional Fellow in the Senate, a researcher at the Institute of Medicine, and from 1976-81, Associate Director for Program Planning and Evaluation at the National Institutes of Health. At NIH, he is widely praised for his role in the development of federal guidelines for recombinant DNA research.

Prior to its agreement with IRS, the Bethesda, Md., institute confined itself almost entirely to supporting specially established biomedical research units at some 20 universities and medical centers. Hughes President Donald S. Fredrickson, who was Director of NIH during Perpich's service there, said that Perpich will be responsible for developing plans to provide $25 million to $50 million a year for Hughes' new education programs.

An announcement from Hughes described these as involving "public understanding of science, and preparation of young people for careers in science." Fredrickson was quoted as saying, "The new program might also support efforts to transform new knowledge in the life sciences into greater understanding of man and the universe."

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Pentagon's Space Budget Nearly Twice as Big as NASA's

The Pentagon has become the nation's biggest space agency, with a budgetary surge that has far outdistanced the resources available to NASA, according to a new study by the General Accounting Office.

It shows that, in current dollars, the Defense Department's spending on space activities rose from $4.8 billion in 1981 to $12.7 billion in 1985. During that same period, NASA's budget rose from $4.9 billion to $6.9 billion.

NASA's ragged condition has led to increasing Congressional skepticism toward the agency's muddled and financially chaotic plans for the space station. Priced last year at $8 billion, the station is now being talked of in terms of $14 billion to $16 billion. White House Science Adviser William R. Graham was questioned closely about the space station on March 4 when he appeared before the House Appropriations Subcommittee that handles the budget for his office.

Chairman Edward Boland (D-Mass.) noted that "some say $20 billion" for the space station.

Graham responded that the space station is "my number one priority in the civil area right now." He said that his office is working closely with the Office of Management and Budget, NASA, and the National Security Council to formulate plans for the station. Boland asked whether "$16 billion [for the space station] is the right way to spend our dollars in space over the next 10 years."

Graham responded, "I don't want to speak about the money right now. Our future in space is a very serious question, and I don't have the answer today."

(The GAO report, "NASA's Appropriations and DOD's Funding Estimates for Space Programs," GAO/NSIAD-87-81FS, 27 pages, is available without charge from US GAO, PO Box 6015, Gaithersburg, Md. 20877; tel. 202/275-6241.)

A Lament for Little Science

The following is from testimony on March 4 by Robert S. Hansen, Director of the Ames Laboratory (a US Department of Energy facility operated by Iowa State University) for 18 years. He appeared before the House Subcommittee on Energy Research and Development, of the Committee on Science, Space, and Technology.

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Our basic dissatisfaction with the [DOE] strategic planning process stems from what we perceive to be the loss of an energy mission focus on the part of the Department of Energy, and its replacement by a facilities focus. It appears to be much easier to persuade Congress and the Executive Branch to finance a $6-billion Superconducting Super Collider or a $300 million synchrotron radiation source than it is to provide basic equipment support to the hundreds of small groups making and characterizing new materials and instruments, uncovering new methods for converting coal to gas and gasoline and broadly underpinning our future energy technologies.

The Ames Laboratory has had no growth (in constant dollars) since 1967, has had no new buildings since 1966, and our *total* Basic Energy Sciences equipment budget for fiscal year 1987 is $1.8 million. The needs of a $20 million/year laboratory simply get lost among these gigantic projects, and by and large, the basic chemistry and materials science efforts that are most likely to support future energy technologies are starved in their behalf (both at the Ames Laboratory and elsewhere).

Big science consumes *all* of the funding for new starts and initiatives; no new program, no matter how small, is permitted to start when a big science project is initiated.

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